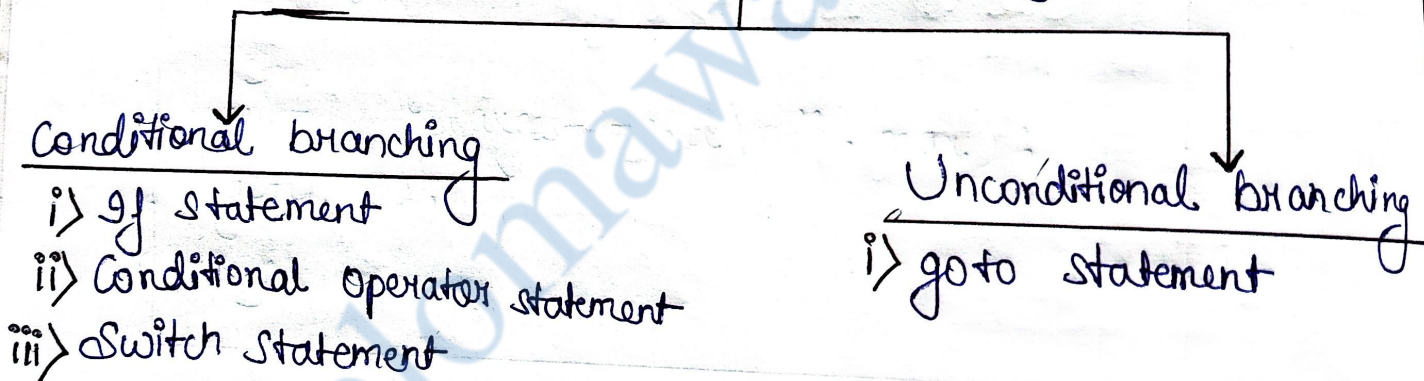


Unit → 3

Decision Making & Branching / Selection Statement:

- Normally a program executes sequentially (line by line) in the order in which they appear in the program.
- Sometimes the program breaks the sequential flow and jumps to another part of the code this is called BRANCHING.
- If the branching is based on any condition it is called conditional branching. If the branching takes place without any decision it is called unconditional branching.

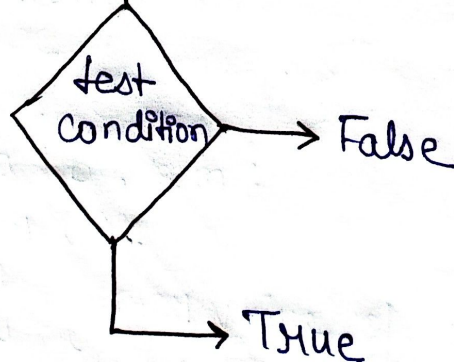
Decision Making & Branching



i) if Statement ...

It is a two way decision making statement.

if statement - Two way



* Different form of if-statement :-

- i) simple if-statement
- ii) if-else statement
- iii) Nested if-else statement
- iv) if-else ladder statement

i) Simple if statement :-

It works with only true condition. If the condition is true then the statement blocks will be executed otherwise nothing will be displayed.

Syntax :-

```
if (test condition)
{
    Statement block;
}
```

True

False

Q. WAP to enter and display good morning if the enter no. is 20.

Ans ⇒ #include <stdio.h>

#include <conio.h>

void main ()

{

int no;

clrscr ();

printf ("enter the number =");

scanf ("%d", &no);

if (no == 20)

{

printf ("Good Morning");

}

getch ();

Q. WAP to find the largest of two number using simple if statement.

Ans ⇒

```
#include <stdio.h>
#include <conio.h>
void main ( )
{
    int a, b, max;
    clrscr ( );
    printf ("enter value of a & b = ");
    scanf ("%d %d", &a & b);
    max = a;
    if (b > max)
    {
        max = b;
    }
    printf ("largest = %d \n", max);
    getch ( );
}
```

Q. WAP to find the smallest of two numbers using simple if statement.

Ans ⇒

```
#include <stdio.h>
#include <conio.h>
void main ( )
{
    int a, b, min;
    clrscr ( );
    printf ("enter value of a & b = ");
    scanf ("%d %d", &a, &b);
}
```

```

min = a;
if (b < min)
{
min = b;
}
printf ("Smallest = %d\n", min);
getch ();
}

```

ii) If-else statement :-

Syntax :-

```

if (test condition)
{
Statement block;
}
else
{
Statement block;
}

```

It works both true and false condition if the test condition is true the statement block followed by if-statement is executed, if the test condition is false the statement block followed by else statement is executed.

Q. WAP to find the largest of two number using if-else statement.

Ans ⇒

```
#include <stdio.h>
#include <conio.h>
void main ( )
{
    int a, b;
    clrscr ( );
    printf ("enter value of a & b = ");
    scanf ("%d %d" &a & b);
    if (a > b)
    {
        printf ("a is largest");
    }
    else
    {
        printf ("b is largest");
    }
    getch ( );
}
```

Q. WAP to find the smallest of two number using if-else statement condition.

Ans ⇒ #include <stdio.h>
#include <conio.h>
void main ()

```
{
    int a, b;
```

```
clrscr();  
printf("enter value of a & b=");
```

Q. WAP to enter a number and check whether number is even or odd.

Ans ⇒

```
#include <stdio.h>  
#include <conio.h>  
void main ()  
{  
int no;  
clrscr();  
printf("enter the no.=");  
scanf("%d" & no);  
if (no % 2 == 0)  
{  
printf("even no=");  
}  
else  
{  
printf("odd no=");  
}  
getch();  
}
```

Q. WAP to enter a year and check whether it is a leap year or not.

Ans ⇒

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    int year;
    clrscr ();
    printf ("enter the year = ");
    scanf ("%d", & year);
    if (year % 4 == 0)
    {
        printf ("leap year = ");
    }
    else
    {
        printf ("No of leap year = ");
    }
    getch ();
}
```

(iii) Nested if - else statement ..

An if - else statement inside another if - else statement is called nested if - else statement.

Syntax :-
if (test condition)
{
if (test condition)

```
{  
Statement block;  
}  
else  
{  
Statement block;  
}
```

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Q. WAP to find the largest of three no. using Nested If-else statement.

```
#include <stdio.h>  
#include <conio.h>  
void main()  
{  
int a, b, c;  
clrscr();  
printf("Enter the value of a, b & c =");  
scanf("%d %d %d" &a, &b, &c);  
if (a > b)  
{  
if (a > c)  
{  
printf("a is largest");  
}  
else  
{  
printf("c is largest");  
}  
}
```

```
}  
else  
{  
  if (a > c);  
{  
  Print f (" b is largest");  
}  
}  
else  
{  
  Print f (" C is largest");  
}  
getch ();  
}
```

Q WAP to find the smallest of three number using Nested If-else statement.

score	condition
0	0 <= <
1	0 <= < 200 <= <
2	0 <= < 200 <= <
100	0 <= <

iv) Ladder - if else statement...

It works like MCQ (Multiple choice question) we have to select only one option out of alternatives based on condition.

Syntax:-

if (test condition)
statement block;

else if (test condition)
statement block;

else
statement block;

Q. WAP to enter the marks between 1 to 100 and display the grade according to following rules:-

Marks (1 to 100)	Grade
≥ 80	A
$\geq 60 \& \< 80$	B
$\geq 40 \& \< 60$	C
< 40	Fail

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int marks;
    clrscr();
    printf("Enter marks between 1 to 100");
    scanf("%d", &marks);
    if (marks  $\geq$  80)
        printf("Grade = A");
    else if (marks  $\geq$  60 & marks  $<$  80)
        printf("Grade = B");
    else if (marks  $\geq$  40 & mark  $<$  60)
        printf("Grade = C");
    else
        printf("Grade = Fail");
    getch();
}
```

ii) Conditional Operator Statement ...

It is also a two-way decision making statement it takes the following form.

Expression 1 ? Expression 2 : Expression 3 ;

Expression 1 is

Expression 1 is

eg:- $x = (10 > 5) ? 100 : 200;$
 $x = 100$

Q WAP to find the largest of two number in conditional operator statement.

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    int a, b, max;
    clrscr ();
    printf ("Enter value of a & b = ");
    scanf ("%d %d" &a, &b);
    max = (a > b) ? a : b;
    printf ("largest = %d \n", max);
    getch ();
}
```

iii) Switch Statement ...

It is a multi way decision making statement. It also works like MCQ, we have to select only one option out of alternatives.

Syntax :-

```
switch (Variable/expression)
{
```

Case 1 :

```
Statement block;
break;
```

Case 2 :

```
Statement block;
break;
```

Case 3 :

```
Statement block;
break;
```

default :

optional

```
Statement block;
break;
```

```
}
```

* Break is used to come out of switch statement.

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    int no;
    clrscr ();
    printf ("Enter no. between 1 to 4 =");
    scanf ("%d", &no);
    switch (no)
    {
```

Case 1:
Print ("one");
break;

Case 2:
Print ("Two");
break;

Case 3:
Print ("Three");
break;

Case 4:
Print ("Four");
break;

default:
Print ("No. is out of range");
break;

}
getch();
}

e)

No. (1 to 7)	days
1	Monday
2	Tuesday
...	...
7	Sunday
> 7	Out of range

No. (1 to 12)	Month
1	January
2	February
...	...
12	December
> 12	out of range

Q. WAP to enter a number and check number is even or odd using switch statement.

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    int no;
    clrscr ();
    printf ("Enter the no=");
    scanf ("%d", &no);
    switch (no%2)
    {
        case 0:
            printf ("No. is even");
            break;
        case 1:
            printf ("No. is odd");
            break;
    }
    getch ();
}
```

Q. WAP to a single character and check weather it is vowel or consonents using switch statement.

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    char ch;
    clrscr ();
    printf ("Enter the single character=");
    scanf ("%c", &ch);
```

```
switch (ch)
```

```
{
```

```
Case 'a' :
```

```
Case 'e' :
```

```
Case 'i' :
```

```
Case 'o' :
```

```
Case 'u' :
```

```
    print ("vowel");  
    break;
```

```
default :
```

```
    print ("consonant");  
    break;
```

```
}
```

```
getch();
```

```
}
```

Unconditional Branching :-

goto () :-

It is an unconditional branching it moves the cursor or control to the desired label.

* Label :- Any label followed by colon.

```
test : → label
```

```
-----
```

```
label :
```

```
-----
```

```
-----
```

```
-----
```

```
goto label;
```

```
a = 1
```

```
a = 2
```

```
a = 3
```

```
a = 4
```

```
a = 5
```

```

#include <stdio.h>
#include <conio.h>
void main()
{
int a = 1;
clrscr();
test:
printf("a = %d\n", a);
if (a != 5)
{
a = a + 1;
goto test;
}
getch();
}

```

Output :-

a = 1
a = 2
a = 3
a = 4
a = 5

-: program's execution #

-: () of of

Label based sort of control is

made of smaller level with -: label #

label -: test

i level

label of of

1 = 0
2 = 0
3 = 0
4 = 0
3 = 0